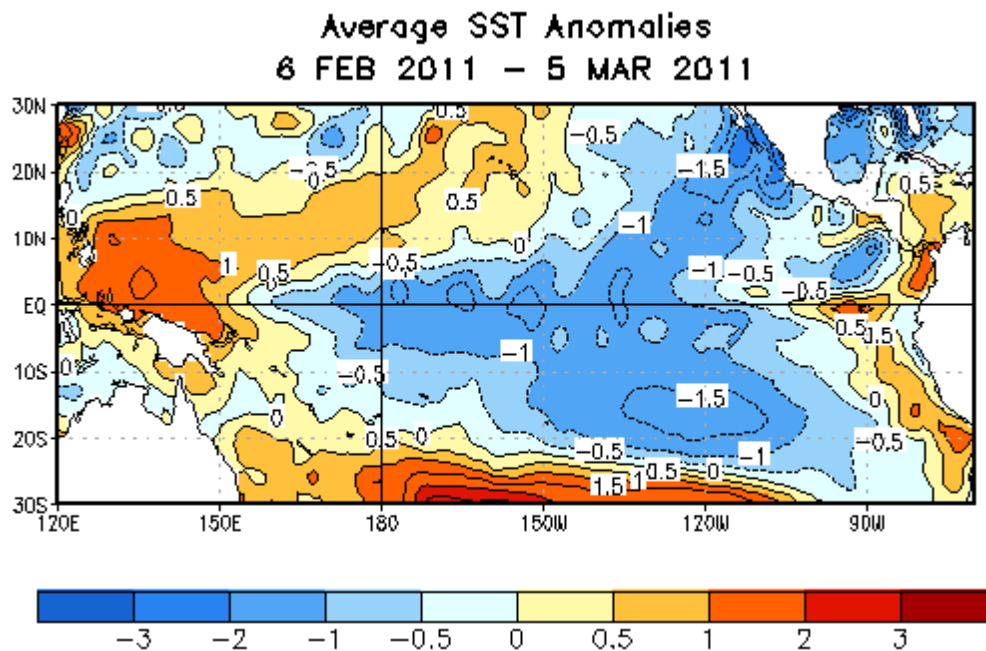


# El Nino/ La Nina Update

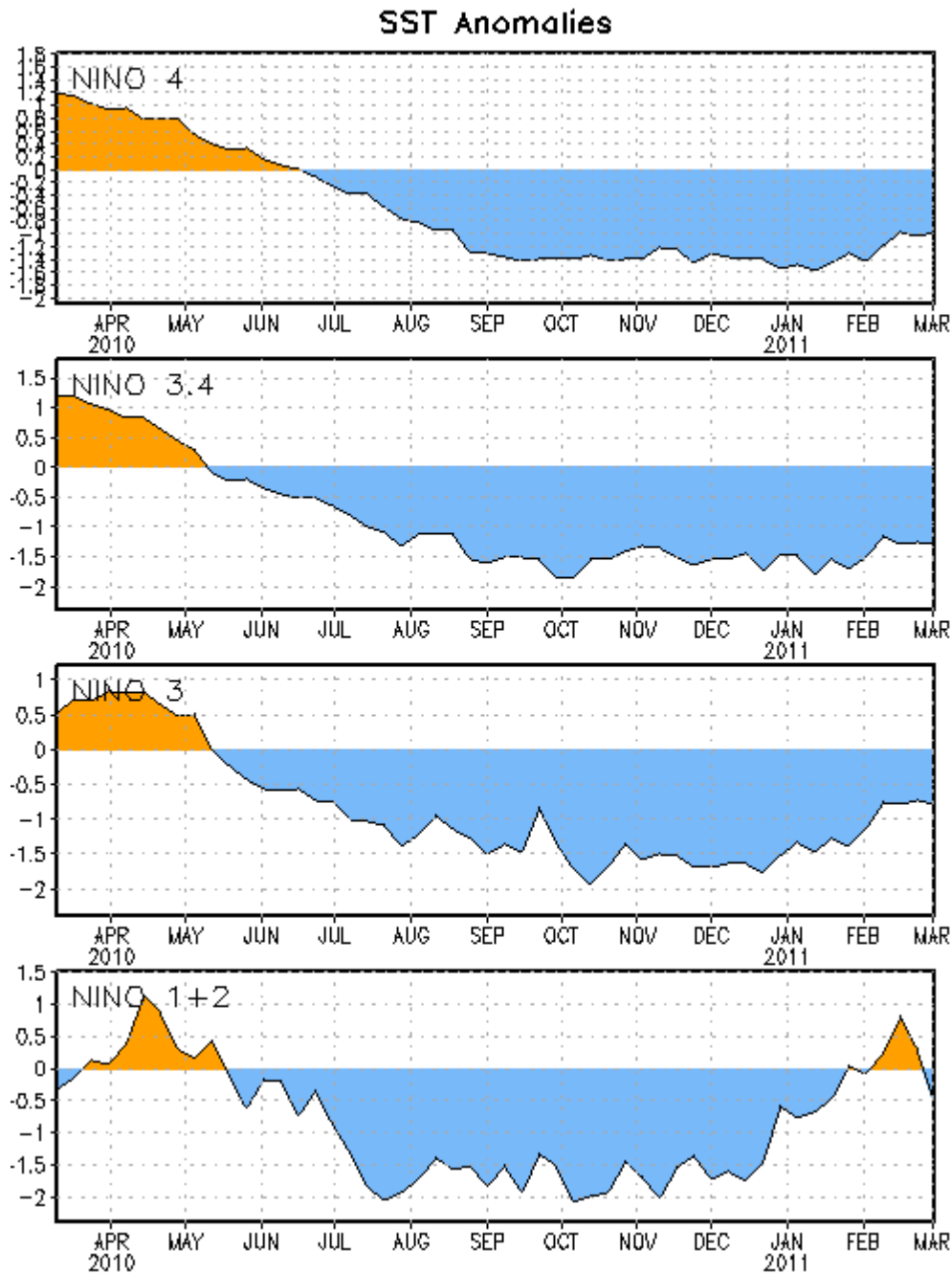
By Don Simonsen—General Forecaster

In 2010, the El Nino pattern of the previous winter quickly faded away and turned to a La Nina pattern in the summer. The departure from normal in regard to sea-surface temperatures in the equatorial Pacific determines whether we are in an El Nino, La Nina, or neutral pattern, and how strong and what stage of development it is in.

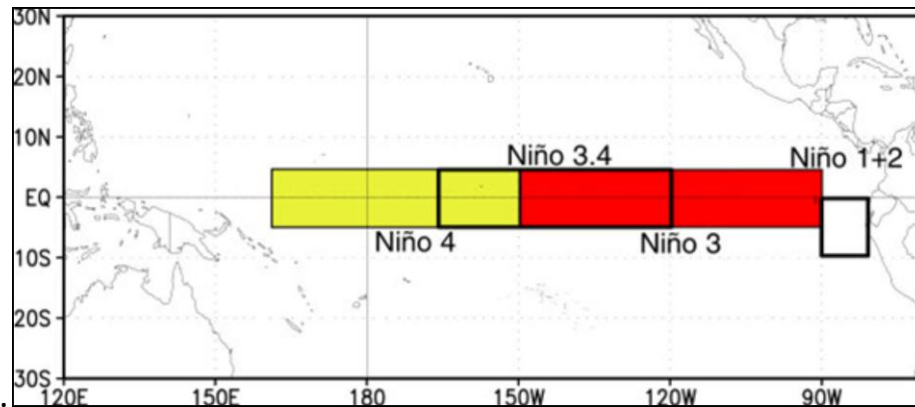


*Note on the above map, the extensive blue areas represent the below normal sea-surface temperatures in the Pacific Ocean. This is indicative of a strong La Nina. The scale is degrees Celsius.*

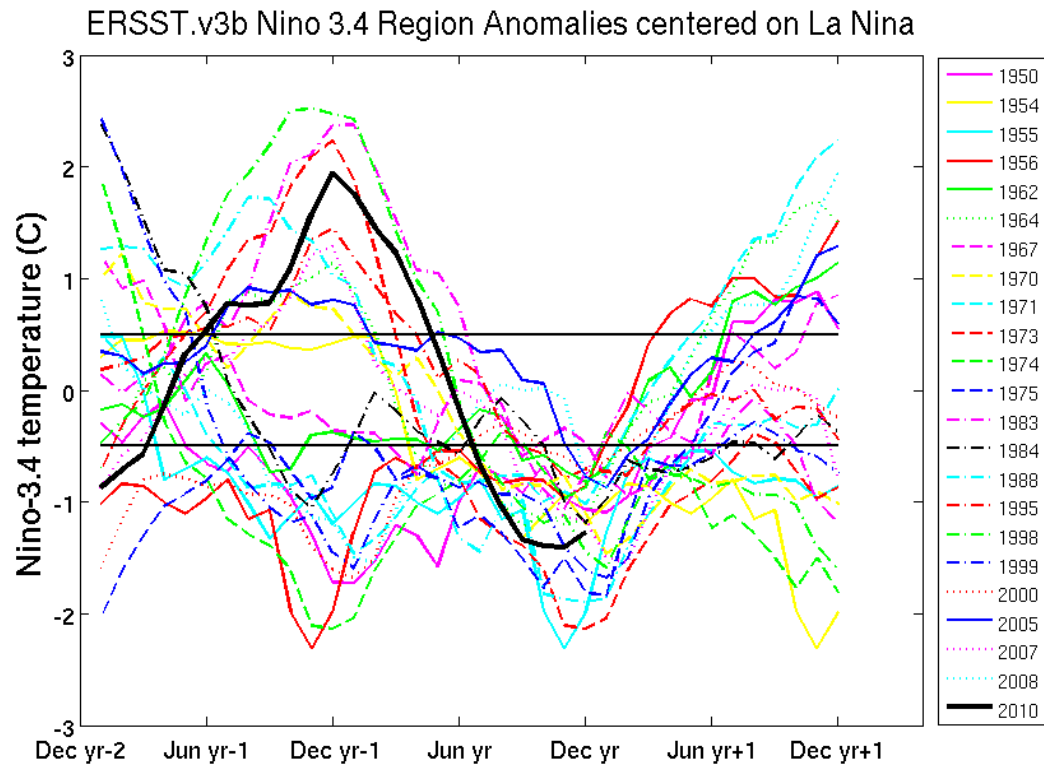
It has been found that large-scale weather patterns throughout the world are affected by El Nino and La Nina. We were in the midst of a strong and prolonged La Nina this winter of 2010-11. This is expected to continue through spring, but it is starting to weaken.



*The above graphs show the change from El Nino to La Nina in 4 regions of the equatorial Pacific in the past year. These regions are most used to determine the status of El Nino/ La Nina. The blue areas show the colder than normal sea- surface temperatures. The chart below shows the locations of these regions.*

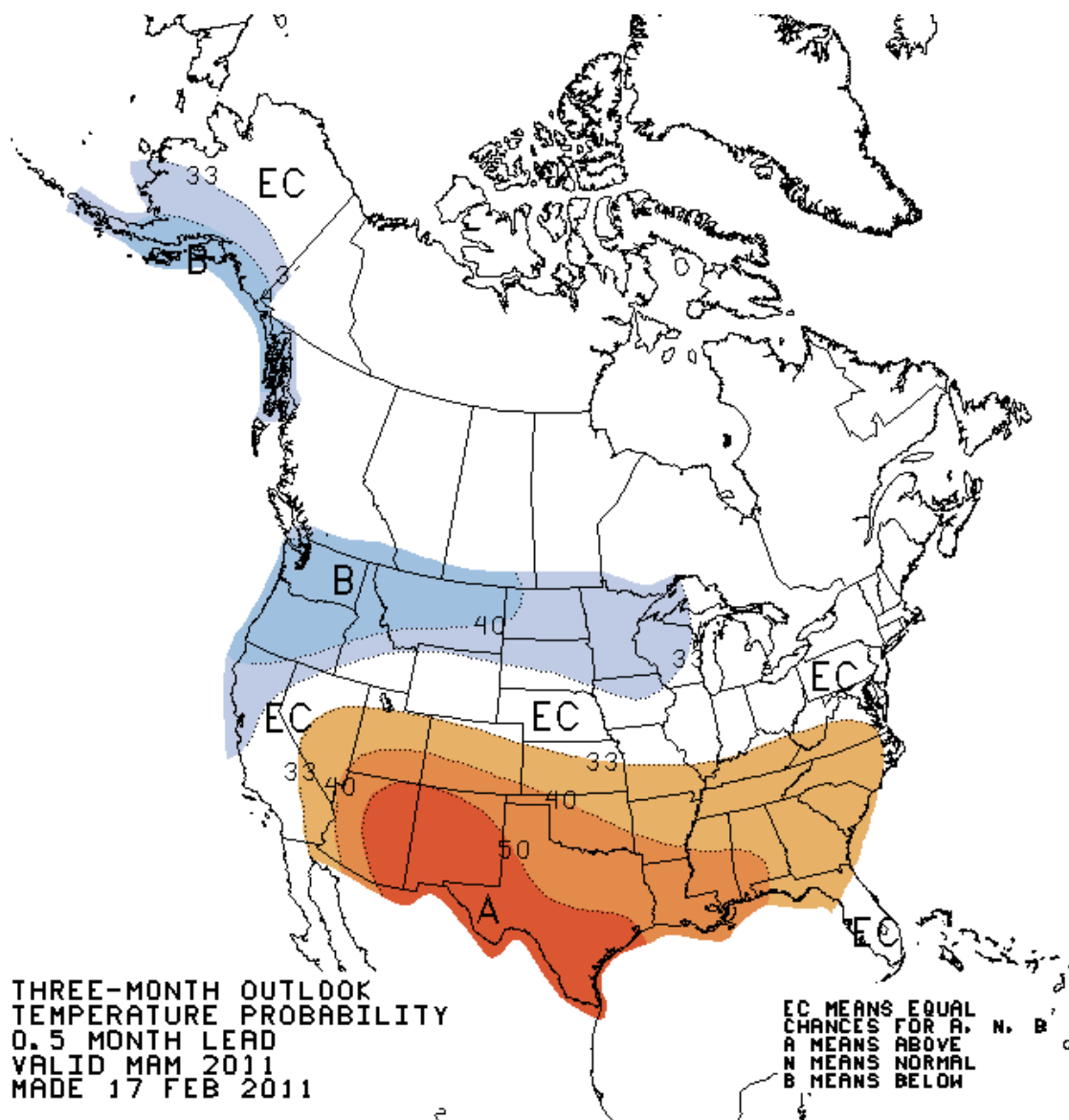


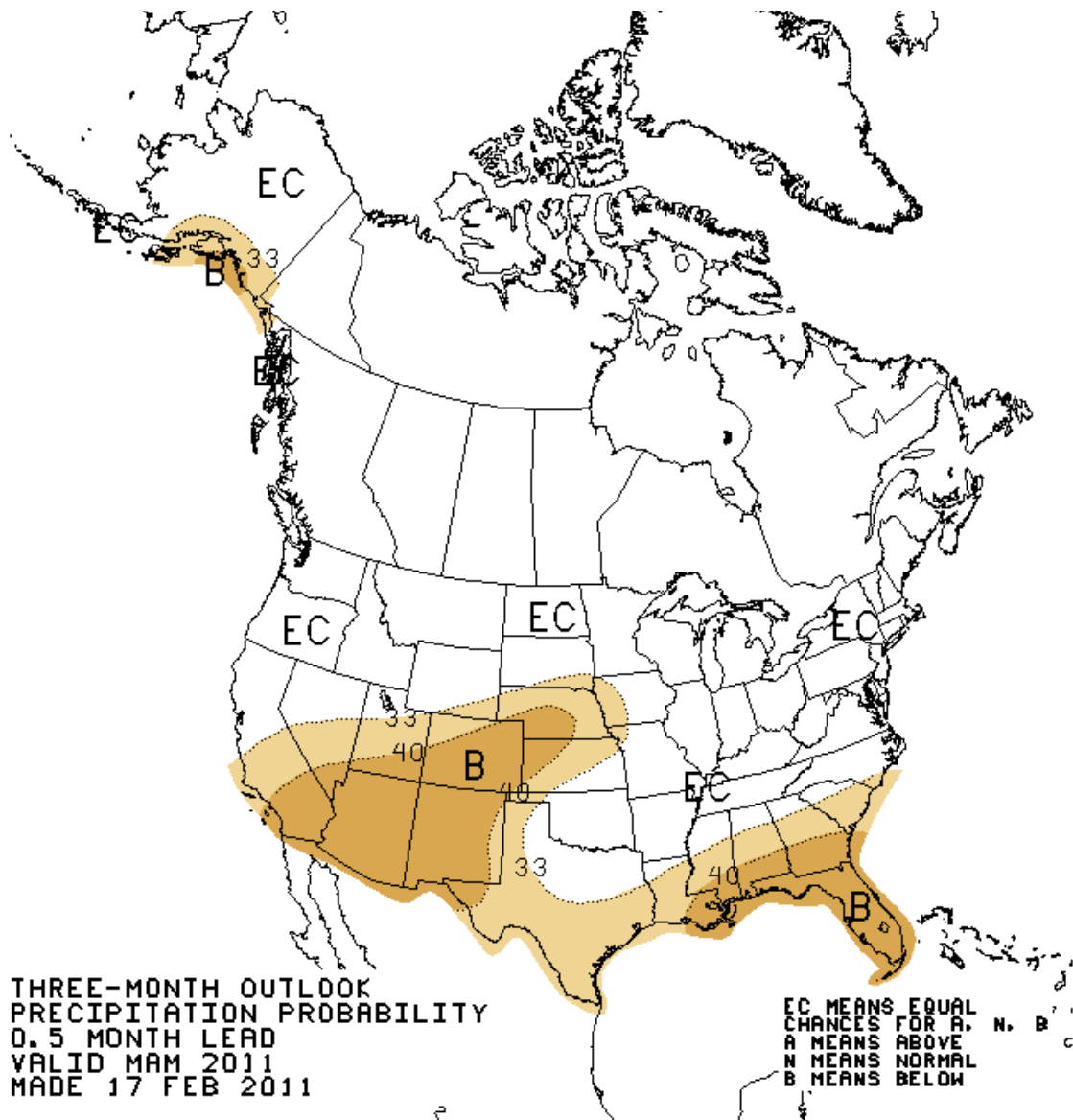
Typically in northeast Montana, La Nina means colder than normal temperatures, and above normal precipitation. This connection with temperature is typically stronger than it is for precipitation. For the 2010-11 winter though, the precipitation connection has been much stronger---with record snowfall in some places, but temperatures colder than normal too. This was due to a different upper air pattern than what is most typical with a La Nina, often the result of other significant upper air influences such as the North Atlantic Oscillation (NAO), Arctic Oscillation (AO), and Madden-Julian Oscillation (MJO) among others. Upper high pressure ridging was quite persistent along the Pacific coastline in January and early February, instead of farther west in the Pacific as is more typical. We have also had more than the usual amount of high latitude closed and cut-off upper highs and lows which tend to be persistent and harder to break down. A persistent NW flow has featured converging Arctic and Pacific airstreams, making for a stormier pattern. Later in the winter, the pattern shifted to a more typical La Nina pattern, with deep upper troughing along the west coast and inland west.



The above chart is a time-line comparison of past La Nina events since 1950, with the heavy black line representing the current La Nina so far. Note how they vary in intensity, and are all different from each other, the different colors representing different occurrences.

With the La Nina still firmly in place, expect continued colder than normal weather well into spring.





The above two maps show the long-range 90 day forecast for March through May. For both temperature and precipitation, the numbers represent confidence levels as a percent chance of that category actually occurring. (above, below, or equal chances). See the Climate Prediction Center for more long range forecasts and information: <http://www.cpc.ncep.noaa.gov/>